

The Value of the Subinternship: A Survey of Fourth Year Medical Students

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Abstract: Background: Although the subinternship is often regarded as an important part of many fourth year curricula it is rarely studied.

Purpose: We aimed to understand the how well the subinternship prepared medical students to perform core clinical skills.

Methods: Senior medical students at Boston University School of Medicine rated their perception of the effectiveness of the subinternship and “medical school overall” in preparing them to perform core clinical skills using a written survey.

Results: Overall, 69% (101) of students responded. Students believe that the subinternship prepares them to perform most key skills involved in day-to-day medical care. However, students feel less prepared by either their subinternship or overall medical school experience to carry out some complex patient communication skills including delivering “bad news” and discussing end-of-life wishes.

Conclusions: The subinternship appears to be effective in preparing students for many of the challenges they will face as an intern and beyond. However, students identified several complex communication skills that could be addressed in part by the subinternship for which they felt unprepared. Student learning would likely be enhanced by creating a longitudinal program to teach these higher-level communication skills during medical school and by integrating practice and feedback of these skills into the subinternship.

Keywords: subinternship, medical students, education, survey

Medical school is a time of great transformation during which students must learn both the science of medicine and a core set of skills common to all physicians. One key element in this process is the subinternship (also known as the acting internship). Since its creation in response to the shortage of interns during World War II,¹ the subinternship has evolved into an integral component of medical school training.² The near universal inclusion of the subinternship within medical school curricula² suggests that both students and educators perceive it as an important experience. Nevertheless medical educators have historically focused more efforts on the third year clerkships³⁻⁶ than the subinternship.^{2, 7-9}

There has been some discussion of^{7, 10} but no consensus on educational goals or methods for this course, and few subinternships have explicit formal curricula.² In practice most subinternships immerse students in the hospital-based care they will experience as graduate medical trainees.

Because of its focus on patient care, the subinternship provides an opportunity for medical students

to gain competence in the skills required for day-to-day clinical practice. It is unclear, however, whether the subinternship successfully meets this need. Trainees’ perceptions of their preparedness to perform specific skills can be a useful measurement of the effectiveness of an educational program.^{11, 12} Therefore we surveyed fourth year medical students to capture their perceived preparation in key skills of day-to-day medical care by their subinternship.

Methods

We conducted a cross-sectional survey of fourth year medical students at Boston University School of Medicine (BUSM). BUSM defines the subinternship as a four-week intensive inpatient clinical experience in which the student is directly responsible (under supervision) for patient care at an advanced level. BUSM requires its students to complete a subinternship in internal medicine, surgery, pediatrics, or family medicine prior to graduation. Almost all students complete their required subinternship by March of their senior year. During the study period each sub-

internship focused on experiential learning with broad curricular goals relating to general knowledge, skills, and attitudes.

In the absence of national guidelines for the sub-internship, we reviewed the existing literature^{2, 7-11, 13} and conducted open-ended interviews with experienced medical educators to better understand the educational scope of the subinternship. We interviewed senior medical educators and clerkship directors both at BUSM and nationally, including members of the subinternship task force of the Clerkship Directors of Internal Medicine (CDIM). Based on this review, two of the authors (EHG and WH) used iterative discussion to identify twenty core skills of day-to-day medical care that are important in the treatment of patients in any discipline and felt to be pertinent to the subinternship (see Table 2). Students assessed their perceived preparation to perform each of these 20 core skills “as an intern” from (1) their subinternship and (2) their overall medical school education. To do this, each student completed two five-point Likert scales that ranged from “not at all prepared” to “very well prepared” for each skill.

The survey instrument was piloted with a group of internal medicine and family medicine fellows who critiqued both the clarity and appropriateness of the instrument. After revision we distributed a four-page questionnaire (see appendix) to all senior medical students during a class meeting and via campus mail between January and March 2002. The BUSM Institutional Review Board approved this study protocol.

Statistical Analysis - All analysis was done using SAS for Windows (8.2, SAS Inc: Carey, NC). Students with responses of 1, 2 or 3 on the Likert scales used to assess perceived preparation were considered “not prepared” in that skill; students who indicated a response of 4 or 5 were considered “prepared.” We used McNemar’s test for homogeneity to determine whether students perceived they were better prepared by medical school than subinternship in each skill.

We sought to better understand personal and institutional characteristics that might influence the effectiveness of the subinternship as a teaching tool for skills for which students felt the least prepared. To do this we identified skills for which fewer than 75% of students believed they were prepared by the subinternship and medical school overall and classified them as “at risk” skills. For each “at risk” skill we evaluated whether the number of subinternships (dichotomized as 1 or more than 1) or the discipline of a student’s subinternship influenced its success as a teaching tool by comparing the percent of students “prepared” in each group with the chi-squared test for homogeneity.

Results

Overall, 101 students (69%) returned a complete survey. Most respondents completed a single subinternship in internal medicine or surgery (see Table 1). When compared to BUSM class statistics, our sample of students is representative of the class as a whole (data not shown). Almost all participants believed that their subinternship prepared them for many of

Table 1

Characteristics of the study pool, expressed mean \pm standard deviation or as percent of total (n = 101).

Characteristic	
Age (mean \pm std dev)	27.7 \pm 4.1
Male (% of total)	54
Number of subinternships completed (median)	1
Residency Career Choice (% of total):	
Internal Medicine, Family Medicine or Pediatrics	45
Surgery, Surgical specialties, Ob-Gyn	24
Other	31
Type of Subinternship (% of total):	
Internal Medicine	57
Surgery or surgical specialty	24
Pediatrics	8
Family Medicine	5
Unable to determine	7

the core skills of internship, including communication with other physicians, interaction with allied health professionals, and performance of the basic administrative and organizational skills involved in day-to-day medical care (see Table 2). We found that students felt they were better prepared to “critically analyze published medical studies” by medical school overall than by their subinternship. Otherwise, students’ opinions of medical school training closely mirrored their opinions of subinternship training (see Table 2).

We identified five “at risk” skills in which fewer than 75% of students believed by they were prepared by both subinternship and medical school overall (see Table 2). Three of these skills, discussing end-of-life care, delivering “bad news,” and assisting with patient or family grief management, represent complex

patient communication skills. The others, identifying adverse drug reactions and assessing patient competency, represent complex diagnostic skills. Notably, 40- 50% of respondents felt unprepared by either the subinternship or their undergraduate medical experience to perform complex patient communication skills at the level of an intern. Perceived preparation in these at risk skills was the same if one or more than one subinternship had been completed. There was a trend for students who completed a pediatrics subinternship to be less prepared in complex communication skills although it did not reach statistical significance. Otherwise, we found no differences in preparation among students who completed medicine, surgery, family medicine, or pediatric subinternships.

Table 2

Respondents who reported feeling prepared by subinternship and “medical school overall” for each skill (expressed as percentage of total, n = 101).

Skill	% prepared by subinternship	% prepared by medical school
<i>Discussing end-of-life care</i>	45	49
<i>Delivering “bad news”</i>	52	61*
<i>Patient/family grief management</i>	53	60
<i>Identifying adverse drug reactions</i>	59	59
Critically analyzing published medical studies	66	82†
<i>Assessing patient decision making capacity</i>	70	63
Interpreting arterial blood gas values	75	82
Arterial Puncture for blood gas	77	77
Physical exam for volume status	78	88*
Communicating with “difficult patients”	83	90
Obtaining informed consent	84	86
Composing discharge summaries	88	89
Using electronic databases/textbooks	94	97
Venipuncture (peripheral vein)	95	95
Case Presentation to other physicians	96	98
Communication with allied health professionals	96	98
Communication with other physicians	96	96
Organizing activities for a work day	96	95
Keeping track of clinical data	97	96
Preparing a “sign-out list”	98	94

Italics indicate “at risk” skills (skills for which <75% of students are prepared by both their subinternship and medical school overall)

* p < .05 and † p < .01 for McNemar’s test comparing to preparation by subinternship. Note that a significant p-value implies that that there is discordance between preparation by subinternship and medical school overall.

Discussion

This survey describes senior medical students' opinions regarding their preparation both by their subinternship and by their four-year medical school experience in twenty core skills of day-to-day medical care. The subinternship's intense clinical focus is reflected in its successes: more than 80% of respondents feel prepared in organization and clinical communication skills. However, fewer students believed they were prepared to perform five clinically important skills by either subinternship or their overall four-year undergraduate medical education. Many of these "at risk" skills, including discussions of end-of-life care, delivering "bad news," and aiding in grief management, were identified as complex communication skills during survey development. We believe that students use clinical experience to gain competence in complex communication skills by observation, reflection, and mentored practice. Thus, although mastery of these skills may be beyond the scope of medical school training, we believe that the clinically challenging subinternship is an important venue during which students should begin this process.

The subinternship's organization may in part explain our findings. Like most institutions,² BUSM's subinternships rely heavily on an experience based-curriculum where clinical challenges, rather than standardized goals, dictate learning. Experiential curricula naturally favor teaching common problems. Thus, the subinternship nearly universally conveys critical but common communication and organization skills required to facilitate day-to-day medical care.

The subinternship's uneven training in more complex patient communication skills may reflect some deficiencies of an experiential curriculum. Although the lack of perceived preparation may reflect the relative rarity of these interactions in some rotations,¹⁴ all students, regardless of subinternship discipline, reported similar degrees of preparation. Alternatively, this apparent deficiency may stem from the inexperience or limited competence by residents, who are often the subintern's primary teachers, to deliver these skills¹⁵⁻¹⁷. Finally, this finding may reflect a temptation for house officers to "shield" subinterns from these duties since they are difficult and time consuming.

This study has several limitations. We surveyed one graduating class of a single medical school. Although we obtained a high response rate from a diverse group of students pursuing many different ca-

reers, our results may not be generalizable. We used a novel survey instrument. Although this instrument has face and content validity, further analysis of validity is hampered by the lack of a "gold standard" to measure trainee preparation in these skills. We surveyed senior medical students. Our own clinical experience suggests that surveying students at this time provides a unique window into their education; however, senior medical students may not have sufficient appreciation of the difficulties involved in carrying out these day-to-day skills of medical practice to adequately self-assess their preparation.

The subinternship appears to be an effective tool in preparing students for many of the challenges they will face during residency and beyond. However our findings challenge medical educators to enhance instruction in higher-level communication skills. Although learning these skills is a goal that extends beyond any single medical school course,¹⁸ the subinternship is particularly well positioned to contribute to this process because of the demands of direct patient care. We encourage subinternship directors to develop mechanisms to emphasize to students, house officers, and attending physicians the importance of learning and practicing these skills during the subinternship. This could be accomplished through a formal subinternship curriculum that includes explicit expectations for skill performance and feedback.¹⁴ Integrating the subinternship into longitudinal medical school curricula to teach higher-level communication skills already under development¹⁹ will better prepare students for the difficult tasks they will face during internship and beyond.

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Appendix 1: The Survey Instrument:

INFORMATION ABOUT YOU

A.1: Which of the following your plans for residency?

- | | |
|--|--|
| <input type="radio"/> Internal medicine | <input type="radio"/> Pediatrics |
| <input type="radio"/> General Surgery | <input type="radio"/> Ob-Gyn |
| <input type="radio"/> Psychiatry | <input type="radio"/> ER |
| <input type="radio"/> Family Medicine | <input type="radio"/> Pathology |
| <input type="radio"/> Ophthalmology | <input type="radio"/> ENT |
| <input type="radio"/> Dermatology | <input type="radio"/> Neurology |
| <input type="radio"/> Physical Medicine and Rehabilitation | <input type="radio"/> Anesthesia |
| <input type="radio"/> Radiology | <input type="radio"/> Neurosurgery |
| <input type="radio"/> Transitional year only | <input type="radio"/> Orthopedic Surgery |
| <input type="radio"/> Other (please specify): _____ | |

A.2 When were you born? 19_____

A.3 What is your gender? male female

A.4 Have you ever **worked** or **volunteered** as a/an... (check all that apply)

- | | |
|--|---|
| <input type="radio"/> Nurse (RN or LPN) | <input type="radio"/> Medical Assistant or Technician |
| <input type="radio"/> Medical First Responder (EMT or firefighter) | <input type="radio"/> Patient Interviewer or Surveyor |
| <input type="radio"/> Mental health counselor | <input type="radio"/> Social Worker |
| <input type="radio"/> Phlebotomist | <input type="radio"/> Lifeguard |

MEDICAL SCHOOL'S IMPACT ON YOUR LEARNING

B.1 Which best describes your **experience** (under supervision) during **medical school overall** with respect to the following tasks?

		Never observed	Observed only	Did once or twice	Did many times	I'm not sure/ I don't recall
1	Assessing a patient's decision making capacity	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2	Assessing volume status on physical exam	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3	Presenting a patient's case to other physicians	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4	Communicating with "difficult patients"	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5	Completing discharge summaries	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6	Communicating with allied health professionals (like nurses, social workers, and case managers)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7	Communicating with other physicians (including primary care physicians and consultants)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8	Critically analyzing published medical studies	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9	Delivering "bad news" to patients	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10	Discussing end-of-life care with patients	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
11	Identifying adverse drug reactions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
12	Interpreting an arterial blood gas (ABG)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
13	Managing a patient's and/or families' grief	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
14	Obtaining an arterial blood gas (ABG)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
15	Obtaining informed consent for tests or procedures	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
16	Organizing activities for a work day (e.g. "scut lists")	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
17	Keeping track of clinical data (test results, etc)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
18	Preparing a "sign-out list" at the end of the day	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
19	Using electronic databases (e.g. Up-To-Date, Cochrane)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
20	Venipuncture (peripheral vein)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

B.2 How well prepared do you feel from **medical school overall** to perform the following tasks as an intern?

		Not at all Prepared	A little Prepared	Somewhat Prepared	Moderately Prepared	Very Well Prepared
1	Assessing a patient's decision making capacity	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2	Assessing volume status on physical exam	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3	Presenting a patient's case to other physicians	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4	Communicating with "difficult patients"	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5	Completing discharge summaries	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6	Communicating with allied health professionals (including nurses, social workers, and case managers)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7	Communicating with other physicians (including primary care physicians and consultants)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8	Critically analyzing published medical studies	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9	Delivering "bad news" to patients	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10	Discussing end-of-life care with patients	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
11	Identifying adverse drug reactions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

		Not at all Prepared	A little Prepared	Somewhat Prepared	Moderately Prepared	Very Well Prepared
12	Interpreting an arterial blood gas (ABG)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
13	Managing a patient's and/or families' grief	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
14	Obtaining an arterial blood gas (ABG)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
15	Obtaining informed consent for tests or procedures	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
16	Organizing activities for a work day (e.g. "scut lists")	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
17	Keeping track of clinical data (test results, etc)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
18	Preparing a "sign-out list" at the end of the day	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
19	Using electronic databases (e.g. Up-To-Date, Cochrane)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
20	Venipuncture (peripheral vein)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

YOUR SUB-INTERNSHIP'S IMPACT ON YOUR LEARNING

C.1 How many different sub-internships have you done so far?

- none yet (**skip** to C.3) one two 3 more than three

C.2 In which disciplines did you do a sub-internship (check all that apply)

- Medicine Pediatrics general surgery Other:

If more than one sub-internship was done, please complete the rest of this survey referring to the sub-internship done at B.U. in the field most like the one you will pursuing during residency.

C.3 On average day during sub-internship, how many patients were you directly responsible for?

C.4 How often were students and/or interns asked to provide ancillary services (including phlebotomy, IV placement, etc) at the hospital where you did your sub-internship?

- never or rarely usually almost always or always

C.5 During sub-internship, how would you best characterize your responsibility (under supervision) for the following aspects of patient care?

		Rarely or never responsible	Usually responsible	Almost always or always responsible
1	Writing admission orders	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2	Writing daily orders	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3	Communicating with attendings	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4	Communicating with consultants	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5	Discharge Planning	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6	Completing discharge summaries	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7	Receiving "first call" from nurses	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

C.6 Which best describes your **experience** (under supervision) during your **sub-internship** with respect to the following tasks?

		Never observed	Observed only	Did once or twice	Did many times	I'm not sure/ I don't recall
1	Assessing a patient's decision making capacity	0	0	0	0	0
2	Assessing volume status on physical exam	0	0	0	0	0
3	Presenting a patient's case to other physicians	0	0	0	0	0
4	Communicating with "difficult patients"	0	0	0	0	0
5	Completing discharge summaries	0	0	0	0	0
6	Communicating with allied health professionals (like nurses, social workers, and case managers)	0	0	0	0	0
7	Communicating with other physicians (including primary care physicians and consultants)	0	0	0	0	0
8	Critically analyzing published medical studies	0	0	0	0	0
9	Delivering "bad news" to patients	0	0	0	0	0
10	Discussing end-of-life care with patients	0	0	0	0	0
11	Identifying adverse drug reactions	0	0	0	0	0
12	Interpreting an arterial blood gas (ABG)	0	0	0	0	0
13	Managing a patient's and/or families' grief	0	0	0	0	0
14	Obtaining an arterial blood gas (ABG)	0	0	0	0	0
15	Obtaining informed consent for tests or procedures	0	0	0	0	0
16	Organizing activities for a work day (e.g. "scut lists")	0	0	0	0	0
17	Keeping track of clinical data (test results, etc)	0	0	0	0	0
18	Preparing a "sign-out list" at the end of the day	0	0	0	0	0
19	Using electronic databases (e.g. Up-To-Date, Cochrane)	0	0	0	0	0
20	Venipuncture (peripheral vein)	0	0	0	0	0

C.7 How well prepared do you feel from **your sub-internship** to perform the following tasks as an intern?

		Not at all Prepared	A little Prepared	Somewhat Prepared	Moderately Prepared	Very Well Prepared
1	Assessing a patient's decision making capacity	0	0	0	0	0
2	Assessing volume status on physical exam	0	0	0	0	0
3	Presenting a patient's case to other physicians	0	0	0	0	0
4	Communicating with "difficult patients"	0	0	0	0	0
5	Completing discharge summaries	0	0	0	0	0
6	Communicating with allied health professionals (like nurses, social workers, and case managers)	0	0	0	0	0
7	Communicating with other physicians (including primary care physicians and consultants)	0	0	0	0	0
8	Critically analyzing published medical studies	0	0	0	0	0
9	Delivering "bad news" to patients	0	0	0	0	0
10	Discussing end-of-life care with patients	0	0	0	0	0
11	Identifying adverse drug reactions	0	0	0	0	0
12	Interpreting an arterial blood gas (ABG)	0	0	0	0	0
13	Managing a patient's and/or families' grief	0	0	0	0	0

		Not at all Prepared	A little Prepared	Somewhat Prepared	Moderately Prepared	Very Well Prepared
14	Obtaining an arterial blood gas (ABG)	0	0	0	0	0
15	Obtaining informed consent for tests or procedures	0	0	0	0	0
16	Organizing activities for a work day (e.g. "scut lists")	0	0	0	0	0
17	Keeping track of clinical data (test results, etc)	0	0	0	0	0
18	Preparing a "sign-out list" at the end of the day	0	0	0	0	0
19	Using electronic databases (e.g. Up-To-Date, Cochrane)	0	0	0	0	0
20	Venipuncture (peripheral vein)	0	0	0	0	0

Thank you for completing this survey!